

## CLAIMS

What is claimed is:

1. An automotive convertible roof, top stack linkage mechanism comprising:

a forwardmost roof bow having a surface that faces upwardly when in its fully extended position;

5 a balance link;

a first roof rail having a first end pivotally attached to the balance link;

a second roof rail having a first end pivotally attached to a second end of the first roof rail and a second end pivotally attached to the roof bow;

10 a first actuating link having one end pivotally attached to the second roof rail;

a first control link having one end pivotally attached to the roof bow and another end pivotally attached to the first actuating link;

a second control link having one end pivotally attached to the first roof rail and another end pivotally attached to the first actuating link; and

15 a second actuating link having an end pivotally attached to a second end of the first actuating link and another end pivotally attached to the balance link;

wherein the upper surface of the forwardmost roof bow continues to face upwardly when in its fully retracted position.

2. The top stack linkage mechanism of claim 1, further comprising a drive link having a first end section pivotally attached to the first roof rail and a second end section pivotally attached to a second pivot point.

3. The top stack linkage mechanism of claim 2, further comprising an automatic actuator connected to the drive link operably rotating the drive link between a first position, wherein the top stack linkage mechanism is positioned in its extended position, and a second position wherein the top stack linkage  
5 mechanism is positioned in its retracted position.

4. The top stack linkage mechanism of claim 3, wherein the automatic actuator is comprised of:

a sector gear coupled to the second end section of the drive link; and  
an electric motor operably driving the sector gear

5. The top stack linkage mechanism of claim 2, further comprising a second roof bow having an end fixedly attached to the drive link.

6. The top stack linkage mechanism of claim 1, further comprising another roof bow having an end pivotally attached to the second pivot point.

7. The top stack linkage mechanism of claim 5, wherein the other roof bow has a substantially inverted U-shape with a cross-car leg spanning between side legs, the side legs being elongated at least two-thirds as much as the cross-car leg.

8. The top stack linkage mechanism of claim 1, wherein an intermediate section of the balance link is pivotally attached to a first pivot point.

9. The top stack linkage mechanism of claim 1, further comprising:

a soft-top cover covering the roof bow; and

a rigid back window attached to the cover and retracting with at least one of the roof rails;

5 the back window being fully retracted to a substantially horizontal orientation substantially parallel to the upper surface of the forwardmost roof bow when it is fully retracted.

10. An automotive convertible roof, folding mechanism comprising:  
a drive link pivotally attached to a first pivot point;  
a balance link pivotally attached to a second pivot point;  
a supplemental link pivotally attaching the drive link to the balance link;  
5 a back window control link pivotally attached to a third pivot point; and  
a back window drive link having one end section pivotally coupled to the  
balance link and another end section pivotally coupled to the back window  
control link.

11. The mechanism of claim 10, further comprising a back window  
peripherally attached to a frame having a substantially inverted U-shape, a leg of  
the frame being pivotally attached to the back window control link.

12. The mechanism of claim 11, wherein the back window frame  
rotates about its pivot connection with the back window control link in a direction  
that is opposite to the direction that the back window control link rotates about  
the third pivot point when moved between its extended and retracted positions.

13. The mechanism of claim 10, further comprising a rigid back window  
having an exterior surface that is rearwardly facing when in its extended position,  
and the exterior surface of the back window facing in a substantially downward  
direction when in its retracted position.

14. The mechanism of claim 10, further comprising a rigid back window positioned below the drive link when retracted.

15. The mechanism of claim 10, further comprising:

a soft-top cover covering the links and having a front section that is upwardly facing when in both its fully extended and fully retracted positions; and

a rigid back window positioned adjacent a void in the cover;

5 the back window being fully retracted to a substantially horizontal orientation below the front section of the cover.

16. The mechanism of claim 10, wherein the drive link rotates about the first pivot point in a direction that is opposite to the direction that the back window control link rotates about the third pivot point when the linkage mechanism is moved between its extended and retracted positions.

17. A convertible roof comprising:  
a drive link;  
a balance link;  
a first roof rail pivotally attached to the balance link and the drive link;  
5 a second roof rail coupled to the first roof rail;  
a scissor linkage mechanism having two links pivotally attached to one another, with an end of one link pivotally attached to the second roof rail and an end of the other link pivotally attached to the first roof rail; and  
a control link pivotally attached to the drive link and the scissor linkage  
10 mechanism.

18. The roof of claim 17, further comprising a first roof bow fixedly attached to a first end section of the second roof rail.

19. The roof of claim 18, further comprising a second roof bow having an end section fixedly attached to the drive link.

20. The roof of claim 19, further comprising a third roof bow having an end section pivotally attached to the drive link.

21. The roof of claim 20, wherein the third roof bow has a substantially inverted U-shape with downwardly extending legs and a cross-car middle section spanning between the legs, and the legs are substantially as long as the cross-car middle section.

22. The roof of claim 17, further comprising:

a soft-top cover covering the links and having a front section that is upwardly facing when in both its fully extended and fully retracted positions; and

a rigid back window positioned adjacent a void in the cover;

5 the back window being fully retractable to a substantially horizontal orientation below the front section of the cover.

23. The roof of claim 17, further comprising:

a sector gear coupled to the drive link; and

an electric motor operably driving the sector gear.

24. The roof of claim 17, further comprising a retractable and rigid back window and a roof bow mounted above the back window when raised, the back window and the roof bow always moving together.

25. An automotive vehicle comprising:

a vehicle body having a windshield header and a substantially vertical and rearmost body panel, the body further having a passenger compartment and a storage compartment, the storage compartment being accessible from and being  
5 rearward of the passenger compartment;

a convertible roof covering the passenger and storage compartments, and extending essentially from the windshield header to the rearmost body panel when in a raised position; and

a forwardmost roof bow attached to the roof, the roof bow having an upper  
10 surface that remains upwardly facing when in both its raised and retracted positions.

26. The vehicle of Claim 25, wherein the storage compartment operably receives the roof when in its retracted position.

27. The vehicle of Claim 26, wherein the storage compartment is configured to receive miscellaneous removable objects even when the roof is in its retracted position, and at least a majority of the roof being of a soft-top variety.

28. The vehicle of Claim 25, wherein the storage compartment is accessible from outside and rear of the body when the roof is in its raised and retracted positions.



29. The vehicle of Claim 25, wherein the portion of the roof above the roof bow serves to cover at least a cross-car middle portion of all of the stored roof.

30. The vehicle of Claim 25, further comprising a back window and side windows attached to the roof.

31. The vehicle of Claim 25, wherein the upper surface of the roof bow is substantially flush with a horizontal plane defined by a beltline of the vehicle body when in its retracted position.

32. The vehicle of Claim 25, wherein there are essentially no structural body panels upwardly protruding from a vehicle beltline rearward of a pair of A-pillars when the roof is fully retracted and the side windows are retracted.

33. An automotive convertible roof comprising:

- a pliable roof cover;
- a forwardmost roof bow attached to the cover;
- a second roof bow supporting the cover; and

5 a rigid back window;

the roof cover, roof bows and back window all being movable between raised and retracted positions; and

the second roof bow always moving with and being supported by the back window.

34. The roof of claim 33, wherein the forwardmost roof bow has a substantially flat section that is upwardly facing when in both its fully raised and fully retracted positions.

35. The roof of claim 34, wherein the back window is fully retracted to a substantially horizontal orientation below the section of the forwardmost roof bow.

36. The roof of claim 33, further comprising a frame attached to at least an upper periphery of the back window and the second roof bow being secured to the frame.

37. The roof of claim 33, wherein the second roof bow is a number four roof bow.

38. An automotive vehicle comprising:

a vehicle body having a windshield header and a substantially vertical and rearmost body panel, the body further having a passenger compartment and a storage compartment, the storage compartment being accessible from and being  
5 rearward of the passenger compartment;

a convertible roof covering the passenger and storage compartments, and extending essentially from the windshield header to the rearmost body panel when in a raised position; and

a forwardmost section of the roof being substantially flush with a beltline of  
10 the vehicle body when in its retracted position.

39. The vehicle of Claim 38, wherein the storage compartment operably receives the roof when in its retracted position.

40. The vehicle of Claim 38, wherein the storage compartment is configured to receive miscellaneous removable objects even when the roof is in its retracted position, and at least a majority of the roof being of a soft-top variety.

41. The vehicle of claim 38, further comprising a forwardmost roof bow having a substantially flat section that is upwardly facing when in both its fully raised and fully retracted positions.

42. The vehicle of claim 41, further comprising a rigid back window fully retracted to a substantially horizontal orientation, the window being coupled to the roof.

43. The vehicle of Claim 38, wherein the storage compartment is accessible from outside and rear of the body when the roof is in its raised and retracted positions.

44. The vehicle of Claim 38, further comprising a back window and side windows attached to the roof.

45. An automotive vehicle comprising:  
a vehicle body having a windshield header and a substantially vertical and  
rearmost body panel, the body further having a passenger compartment and a  
storage compartment, the storage compartment being accessible from and being  
5 rearward of the passenger compartment; and  
a convertible roof covering the passenger and storage compartments, and  
extending essentially from the windshield header to the rearmost body panel  
when in a raised position;  
wherein the storage compartment operably receives the roof when in its  
10 retracted position; and  
wherein the storage compartment is configured to receive miscellaneous  
removable objects even when the roof is in its retracted position.

46. The vehicle of claim 45, further comprising a forwardmost roof bow  
having a substantially flat section that is upwardly facing when in both its fully  
raised and fully retracted positions.

47. The vehicle of claim 46, further comprising a rigid back window  
being fully retracted to a substantially horizontal orientation below the section of  
the forwardmost roof bow.

48. The vehicle of Claim 45, further comprising a back window and side windows attached to the roof, the roof being of a soft-top variety.

49. The vehicle of claim 45, further comprising a retractable and rigid back window and a roof bow mounted above the back window when raised, the back window and the roof bow always moving together.